

Appendix G
Air Quality Modeling Results

Appendix G. Air Quality Construction Emissions Calculations

Table G-1. Estimated Construction-Related Emissions Alignments 1 and 4 with Pump Station

Acres excavated/moved each day	⇒	5 (Midwest Research Institute 1995)
Acres graded each day	⇒	2 (Midwest Research Institute 1995)

Equipment Type		Number of Vehicles	Hours per Day	Emission Rate (gm/hr) (U.S. Environmental Protection Agency 1985)				
				TOG	CO	NOx	PM10	SOx
track-type tractor	⇒	0	10	55.06	157.01	570.70	50.70	62.30
wheeled tractor	⇒	1	10	85.26	1622.77	575.84	61.50	40.90
cold planers and wheeled dozers	⇒	0	10	86.84	816.81	1889.16	75.00	158.00
scraper	⇒	2	10	128.15	568.19	1740.74	184.00	210.00
motor grader	⇒	2	10	18.07	68.46	324.43	27.70	39.00
wheeled loader	⇒	2	10	113.17	259.58	858.19	77.90	82.50
track-type loader	⇒	0	10	44.55	91.15	375.22	26.40	34.40
off-highway truck	⇒	2	10	86.84	816.81	1889.16	116.00	206.00
static and vibratory rollers	⇒	1	10	30.58	137.97	392.90	22.70	30.50
excavators/crawlers, trenchers	⇒	2	10	69.35	306.37	767.30	63.20	64.70
concrete pavers, asphalt pavers	⇒	0	10	69.35	306.37	767.30	63.20	64.70
cranes and miscellaneous equipment	⇒	1	10	69.35	306.37	767.30	63.20	64.70
on-road trucks (EMFAC7F v1.1)	⇒	240	10	350.00		1000.00	63.00	

Emission Source	Emissions (ppd)				
	ROG	CO	NOx	PM10	SOx
Construction vehicle exhaust emissions	1724.3	134.6	5575.4	357.3	29.6
Fugitive PM10				210.0	
Total emissions (ppd)	1724.3	134.6	5575.4	567.3	29.6
Total emissions (tpy)	215.5	16.8	696.9	70.9	3.7

Notes:

Acreage for pipeline construction and pump station construction based on judgment.

Equipment usage based on judgment and engineering input from CH2M Hill.

On-road trucks based on engineering input from CH2M Hill and assumes 1.5 hours per trip.

CO = carbon monoxide.

NOx = oxides of nitrogen.

PM10 = inhalable particulate matter less than 10 microns in diameter.

TOG = total organic gases.

SOx = sulfur oxides.

ppd = parts per day.

tpy = tons per day.

gm/hr = grams per hour.

Appendix G. Air Quality Monitoring Data

Table G-2. Estimated Construction-Related Emissions Alignment 2 with Pump Station								
Acres excavated/moved each day		⇒	5 (Midwest Research Institute 1995)					
Acres graded each day		⇒	2 (Midwest Research Institute 1995)					
Equipment Type		Number of Vehicles	Hours per Day	Emission Rate (gm/hr) (U.S. Environmental Protection Agency 1985)				
				TOG	CO	NOx	PM10	SOx
track-type tractor	⇒	0	10	55.06	157.01	570.70	50.70	62.30
wheeled tractor	⇒	1	10	85.26	1622.77	575.84	61.50	40.90
cold planers and wheeled dozers	⇒	0	10	86.84	816.81	1889.16	75.00	158.00
scraper	⇒	2	10	128.15	568.19	1740.74	184.00	210.00
motor grader	⇒	2	10	18.07	68.46	324.43	27.70	39.00
wheeled loader	⇒	2	10	113.17	259.58	858.19	77.90	82.50
track-type loader	⇒	0	10	44.55	91.15	375.22	26.40	34.40
off-highway truck	⇒	2	10	86.84	816.81	1889.16	116.00	206.00
static and vibratory rollers	⇒	1	10	30.58	137.97	392.90	22.70	30.50
excavators/crawlers, trenchers	⇒	2	10	69.35	306.37	767.30	63.20	64.70
concrete pavers, asphalt pavers	⇒	0	10	69.35	306.37	767.30	63.20	64.70
cranes and miscellaneous equipment	⇒	1	10	69.35	306.37	767.30	63.20	64.70
on-road trucks (EMFAC7F v1.1)	⇒	117	10	350.00		1000.00	63.00	
		Emissions (ppd)						
Emission Source		ROG	CO	NOx	PM10	SOx		
Construction vehicle exhaust emissions		851.2	134.6	2863.7	186.4	29.6		
Fugitive PM10					210.0			
Total emissions (ppd)		851.2	134.6	2863.7	396.4	29.6		
Total emissions (tpy)		106.4	16.8	358.0	49.6	3.7		
Notes:								
Acreage for pipeline construction and pump station construction based on judgment.								
Equipment usage based on judgment and engineering input from CH2M Hill.								
On-road trucks based on engineering input from CH2M Hill and assumes 1.5 hours per trip.								
CO	= carbon monoxide.							
NOx	= oxides of nitrogen.							
PM10	= inhalable particulate matter less than 10 microns in diameter.							
TOG	= total organic gases.							
SOx	= sulfur oxides.							
ppd	= parts per day.							
tpy	= tons per day.							
gm/hr	= grams per hour.							

Table G-3. Estimated Construction-Related Emissions American River Discharge Structure

Acres excavated/moved each day		==>	2 (Midwest Research Institute 1995)					
Acres graded each day		==>	2 (Midwest Research Institute 1995)					
			Emission Rate (gm/hr)					
			(U.S. Environmental Protection Agency 1985)					
Equipment Type		Number of Vehicles	Hours per Day	TOG	CO	NOx	PM10	SOx
track-type tractor	==>	2	10	55.06	157.01	570.70	50.70	62.30
wheeled tractor	==>	0	10	85.26	1622.77	575.84	61.50	40.90
cold planers and wheeled dozers	==>	0	10	86.84	816.81	1889.16	75.00	158.00
scraper	==>	0	10	128.15	568.19	1740.74	184.00	210.00
motor grader	==>	0	10	18.07	68.46	324.43	27.70	39.00
wheeled loader	==>	2	10	113.17	259.58	858.19	77.90	82.50
track-type loader	==>	0	10	44.55	91.15	375.22	26.40	34.40
off-highway truck	==>	1	10	86.84	816.81	1889.16	116.00	206.00
static and vibratory rollers	==>	0	10	30.58	137.97	392.90	22.70	30.50
excavators/crawlers, trenchers	==>	1	10	69.35	306.37	767.30	63.20	64.70
concrete pavers, asphalt pavers	==>	0	10	69.35	306.37	767.30	63.20	64.70
cranes and miscellaneous equipment	==>	1	10	69.35	306.37	767.30	63.20	64.70
on-road trucks (EMFAC7F v1.1)	==>	8	10	350.00		1000.00	63.00	
			Emissions (ppd)					
Emission Source		ROG	CO	NOx	PM10	SOx		
Construction vehicle exhaust emissions		68.2	49.9	314.9	22.1	13.8		
Fugitive PM10					96.0			
Total emissions (ppd)		68.2	49.9	314.9	118.1	13.8		
Total emissions (tpy)		8.5	6.2	39.4	14.8	1.7		
Notes:								
Acreage for pipeline construction and pump station construction based on judgment.								
Equipment usage based on judgment and engineering input from CH2M Hill.								
On-road trucks based on engineering input from CH2M Hill and assumes 1.5 hours per trip.								
CO = carbon monoxide.								
NOx = oxides of nitrogen.								
PM10 = inhalable particulate matter less than 10 microns in diameter.								
TOG = total organic gases.								
SOx = sulfur oxides.								
ppd = parts per day.								
tpy = tons per day.								
gm/hr = grams per hour.								

Appendix G. Air Quality Monitoring Data

Table G-4. Estimated Construction-Related Emissions Pipeline								
Acres excavated/moved each day		==>	2 (Midwest Research Institute 1995)					
Acres graded each day		==>	2 (Midwest Research Institute 1995)					
Equipment Type		Number of Vehicles	Hours per Day	Emission Rate (gm/hr) (U.S. Environmental Protection Agency 1985)				
				TOG	CO	NOx	PM10	SOx
track-type tractor	==>	0	10	55.06	157.01	570.70	50.70	62.30
wheeled tractor	==>	1	10	85.26	1622.77	575.84	61.50	40.90
cold planers and wheeled dozers	==>	0	10	86.84	816.81	1889.16	75.00	158.00
scraper	==>	2	10	128.15	568.19	1740.74	184.00	210.00
motor grader	==>	2	10	18.07	68.46	324.43	27.70	39.00
wheeled loader	==>	2	10	113.17	259.58	858.19	77.90	82.50
track-type loader	==>	0	10	44.55	91.15	375.22	26.40	34.40
off-highway truck	==>	2	10	86.84	816.81	1889.16	116.00	206.00
static and vibratory rollers	==>	1	10	30.58	137.97	392.90	22.70	30.50
excavators/crawlers, trenchers	==>	2	10	69.35	306.37	767.30	63.20	64.70
concrete pavers, asphalt pavers	==>	0	10	69.35	306.37	767.30	63.20	64.70
cranes and miscellaneous equipment	==>	1	10	69.35	306.37	767.30	63.20	64.70
on-road trucks (EMFAC7F v1.1)	==>	239	10	350.00		1000.00	63.00	
Emission Source		Emissions (ppd)						
		ROG	CO	NOx	PM10	SOx		
Construction vehicle exhaust emissions		1717.2	134.6	5553.4	355.9	29.6		
Fugitive PM10					96.0			
Total emissions (ppd)		1717.2	134.6	5553.4	451.9	29.6		
Total emissions (tpy)		214.7	16.8	694.2	56.5	3.7		
Notes:								
Acreage for pipeline construction and pump station construction based on judgment.								
Equipment usage based on judgment and engineering input from CH2M Hill.								
On-road trucks based on engineering input from CH2M Hill and assumes 1.5 hours per trip.								
CO = carbon monoxide.								
NOx = oxides of nitrogen.								
PM10 = inhalable particulate matter less than 10 microns in diameter.								
TOG = total organic gases.								
SOx = sulfur oxides.								
ppd = parts per day.								
tpy = tons per day.								
gm/hr = grams per hour.								

Table G-5. Estimated Construction-Related Emissions Fairbairn Treatment Plant

Table G-5. Estimated Construction-Related Emissions Fairbairn Treatment Plant								
Acres excavated/moved each day		⇒	0 (Midwest Research Institute 1995)					
Acres graded each day		⇒	3 (Midwest Research Institute 1995)					
			Emission Rate (gm/hr)					
			(U.S. Environmental Protection Agency 1985)					
Equipment Type		Number of Vehicles	Hours per Day	TOG	CO	NOx	PM10	SOx
track-type tractor	⇒	2	10	55.06	157.01	570.70	50.70	62.30
wheeled tractor	⇒	0	10	85.26	1622.77	575.84	61.50	40.90
cold planers and wheeled dozers	⇒	0	10	86.84	816.81	1889.16	75.00	158.00
scraper	⇒	1	10	128.15	568.19	1740.74	184.00	210.00
motor grader	⇒	1	10	18.07	68.46	324.43	27.70	39.00
wheeled loader	⇒	2	10	113.17	259.58	858.19	77.90	82.50
track-type loader	⇒	0	10	44.55	91.15	375.22	26.40	34.40
off-highway truck	⇒	1	10	86.84	816.81	1889.16	116.00	206.00
static and vibratory rollers	⇒	1	10	30.58	137.97	392.90	22.70	30.50
excavators/crawlers, trenchers	⇒	1	10	69.35	306.37	767.30	63.20	64.70
concrete pavers, asphalt pavers	⇒	0	10	69.35	306.37	767.30	63.20	64.70
cranes and miscellaneous equipment	⇒	1	10	69.35	306.37	767.30	63.20	64.70
on-road trucks (EMFAC7F v1.1)	⇒	8	10	350.00		1000.00	63.00	
Emissions (ppd)								
Emission Source		ROG	CO	NOx	PM10	SOx		
Construction vehicle exhaust emissions		71.8	67.0	369.0	27.3	19.9		
Fugitive PM10					30.0			
Total emissions (ppd)		71.8	67.0	369.0	57.3	19.9		
Total emissions (tpy)		9.0	8.4	46.1	7.2	2.5		
Notes:								
Acreage for pipeline construction and pump station construction based on judgment.								
Equipment usage based on judgment and engineering input from CH2M Hill.								
On-road trucks based on engineering input from CH2M Hill and assumes 1.5 hours per trip.								
CO = carbon monoxide.								
NOx = oxides of nitrogen.								
PM10 = inhalable particulate matter less than 10 microns in diameter.								
TOG = total organic gases.								
SOx = sulfur oxides.								
ppd = parts per day.								
tpy = tons per day.								
gm/hr = grams per hour.								

REFERENCES

- Midwest Research Institute. 1995.
Improvements of specific emission factors.
South Coast Air Quality Management
District. Kansas City, MO.
- U.S. Environmental Protection Agency. 1985.
Compilation of air pollutant emission
factors. Volume II: mobile sources. 4th
edition. Research Triangle Park, NC.